

# **The main applications of smart phones and their security in China**

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<p>Nowadays, we need the smart phones and the applications on the phone everywhere and every time. We even cannot live without them. As the smart phone becomes so important in our life, we need to consider some problems it brings also. It is the security problem. In my thesis, I mainly talked about the applications and how about their security in China.</p> <p>To know the applications in China, it first introduces the smart phone markets in China. Based on the big market of smart phones, it comes out thousands of applications now. So it talks how many kinds of applications are using now in China. Before talking about security problems, we first need to know what can be called as security. To know the question about the security of these applications, I use methods like data searching and interview. The last which is also the main part, it talks about some main used applications like WeChat, QQ, Alipay, Taobao, UC, Baidu Browser, QQ Browser, 360 Browser, 360Mobile Security, Tencent Mobile Manager, Baidu Mobile Security, and Ali Qiadun. And it also talks about some security problems when we use them.</p> <p>Finally, we know the risks on these applications like losing personal information, getting harassing call, receiving spam messages, being cheated. And I offer many measures to prevent the risks. And in fact, it does not only happen in China, but also in the similar applications in other countries. So my thesis is very useful to many smart phone users.</p>	
<b>Keywords</b> Applications, China, Security, Smart phone, Cheat.	

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# 1 Introduction

Nowadays, smart phones become more and more important in our life.

If you don't think so. Let me ask you some questions. Without the phone, who wakes you up in the morning? Without it, what will you do when you on the way to work? Without it, how can you make sure the status of the goods you buy online whenever and wherever you are? How can you know your friends mode in time? How can you show your gifts, the dishes you make, and your feeling to your friends in time? After thinking about the answers to these questions, you must say 'YES' to my point, which smart phone plays an important role in our life.

Maybe you still think that you can set alarm to wake you up in the morning, you can just stay there or read books or newspapers on the transportation to work, and you can read the status of friends on the computer. But the normal alarm cannot be set to only ring you up on weekdays, you need to close it when you don't need it; it doesn't ring again after 5 minutes if you are feeling too lazy to get out of bed and need more 5 minutes to be on the bed. On the way to work, in China the time that you use from home to work at least needs 40 minutes, in Beijing you may need 1 and a half hours (China Daily 2014), how can you just sit there do nothing during this time; about reading newspapers, well it really doesn't have that extra space for your large newspaper as there are so many people around you. If you are in Beijing, you may also cannot get on the subway at morning time, the carriage are full of people, even the phones cannot be used in this situation let alone books. Using computers to read the status of your friends, you cannot give your common or your congratulations in time. And when you have the computer at hand, you may already lose the desire to show off something or the sorrowful feeling to your friends. So the smart phone is really important in our life.

For me, every morning I am woken up by the phone. Then I use it to check the weather report to see what to dress, and check the bus time. On the way to work, using the phone to check emails, to have a look at the moments of WeChat, make comment and 'like' after their sharing photos. When I have the rest during the work, also check it or post text about my life or sending messages to friends. After working, at home, if I did some dishes that I have never made and also I made it with good looking, I will post a photo to share with friends and waiting for their 'like'. On the bed using it to read some articles or novels makes more easily to sleep. Well, as I use it so often, I cannot help to think is it safe when I am using the phone, is there any problem when I use the applications on the phone. So I'd like to talk about the applications and their safety that Chinese use.

Before talking about applications and their security in China. We need to know the smart phone market in China, so let me introduce this first.

## 2 Smart phone markets in China

In the first half year of 2016, the sales volume of Chinese smart phone market is 250 million.

Table 1. Chinese smart phones top 20 brands sales report of the whole market (offline market and online market) for the first half of year 2016 (Sohu, Inc. 2016a.)

Chinese smart phones top 20 brands sales report of the whole market for the first half of year 2016							
Brand	2016Q1	2016Q2	2016Q3	2016Q4	2016Q5	2016Q6	Total
Huawei	7,902,423	6,766,000	7,149,362	6,753,104	7,086,777	8,122,056	43,779,722
Oppo	4,131,761	4,618,846	4,550,863	4,272,501	5,467,198	5,983,003	29,024,172
Apple	5,003,775	4,331,504	4,566,513	4,520,017	4,454,383	4,784,980	27,661,172
Vivo	3,950,357	4,524,814	4,245,963	3,737,698	4,380,191	4,712,768	25,551,791
MI	3,949,546	3,809,203	3,938,542	3,570,167	3,727,789	4,663,757	23,659,004
Samsung	2,403,060	2,139,247	2,364,187	2,191,072	2,209,462	2,266,133	13,573,161
Meizu	1,923,832	2,016,969	1,727,652	1,534,827	1,738,572	2,305,191	11,247,043
Gionee	1,430,817	1,585,834	1,520,781	1,359,879	1,646,451	1,851,944	9,395,706
Letv Phone	1,279,984	926,718	1,160,240	1,618,530	2,001,291	2,304,116	9,290,879
Coolpad	1,135,377	1,034,745	1,184,643	1,100,752	1,140,272	931,928	6,527,717
Lenovo	1,377,512	1,066,184	984,773	868,963	798,259	749,326	5,845,017
Lephone	751,411	502,371	651,293	740,153	909,110	957,226	4,511,564
Xiaolajiao	628,779	517,476	612,614	685,538	721,554	725,879	3,891,840
360	579,205	576,083	613,613	536,696	473,501	483,884	3,262,982
ZTE	446,972	380,946	482,571	442,632	536,447	679,413	2,968,981
Hisense	465,877	273,280	307,914	298,486	328,699	340,508	2,014,764
Koobee	270,358	273,170	285,705	259,608	300,417	308,295	1,697,553
CMCC	368,541	240,978	308,825	230,664	174,058	138,478	1,461,544
KOPO	177,795	173,476	248,170	212,002	298,837	258,346	1,368,626
TCL	458,415	305,574	253,853	134,734	101,355	83,585	1,337,516
Others	3,912,117	3,514,960	3,672,655	3,320,094	3,645,126	4,089,292	22,154,244
<b>Whole market</b>	<b>42,547,914</b>	<b>39,578,378</b>	<b>40,830,732</b>	<b>38,388,117</b>	<b>42,139,749</b>	<b>46,740,108</b>	<b>250,224,998</b>

Huawei is the most salable, with the sales volume of 43,779 thousand, which is even higher than the sum sales of Apple and Samsung together. Oppo comes the second

place, sales 29,024 thousand; and Apple is the third one, the sales volume is 27,661 thousand. The Vivo and MI follow them.

On the offline market, Oppo becomes the first, because of the success of R9 series.

Oppo's official website shows that since the R9 sales on the market, it sales 7,000 thousand in only 88 days. One customer chooses R9 in every 1.1 seconds. And the following are Huawei, Vivo and Apple.

Table 2. Chinese smart phones top 20 brands sales report of offline market for the first half of year 2016 (Sohu, Inc. 2016a.)

Chinese smart phones top 20 brands sales report of offline market for the first half of year 2016							
Brand	2016Q1	2016Q2	2016Q3	2016Q4	2016Q5	2016Q6	Total
OPPO	4,009,368	4,533,442	4,395,442	4,090,538	5,292,410	5,727,700	28,048,900
Huawei	4,678,445	4,440,456	4,750,763	4,317,770	4,736,866	5,039,615	27,963,915
vivo	3,826,112	4,439,507	4,127,240	3,633,314	4,220,430	4,566,900	24,813,503
Apple	4,031,997	3,755,498	3,849,562	3,679,528	3,719,464	3,511,044	22,547,093
Samsung	2,073,386	1,934,225	2,041,044	1,890,326	1,939,112	1,863,964	11,742,057
Gionee	1,411,189	1,574,508	1,505,947	1,341,524	1,631,000	1,830,363	9,294,531
Meizu	1,114,761	1,173,048	1,098,346	818,106	1,031,085	1,279,941	6,515,287
Coolpad	1,086,746	999,893	1,140,251	1,057,361	1,092,741	892,488	6,269,480
MI	1,256,024	1,160,547	1,109,807	893,595	895,898	891,451	6,207,322
Lenovo	1,249,604	955,664	866,668	739,518	684,409	610,108	5,105,971
Lepphone	751,411	502,371	651,293	740,153	909,110	957,226	4,511,564
Letv Phone	598,948	514,881	603,650	542,004	573,323	1,140,395	3,973,201
xiaolajiao	522,776	407,815	491,951	578,608	606,376	593,818	3,201,344
ZTE	331,015	284,140	384,901	337,675	437,996	554,010	2,329,737
Hisense	462,693	271,241	304,735	292,286	323,084	335,052	1,989,091
Koobee	269,980	273,010	285,276	259,411	300,246	308,217	1,696,140
CMCC	367,224	240,325	307,444	227,843	171,701	136,503	1,451,040
KOPO	177,795	173,476	248,170	212,002	298,837	258,346	1,368,626
TCL	449,378	301,691	248,237	130,657	98,510	80,888	1,309,361
DOOV	119,580	195,870	133,708	142,707	216,250	256,362	1,064,477
Others	3,492,109	3,014,946	3,221,296	2,917,524	3,328,366	3,684,039	19,658,280
<b>Offline market</b>	<b>32,280,541</b>	<b>31,146,554</b>	<b>31,765,731</b>	<b>28,842,450</b>	<b>32,507,214</b>	<b>34,518,430</b>	<b>191,060,920</b>

While the online market, MI becomes the first, with the sales of 17,451 thousand. Huawei is the second, but its sales are very close to MI, the sales is 15,815 thousand. They have a long lead on the third one Letv.

Table 3. Chinese smart phones top 20 brands sales report of online market for the first half of year 2016 (Sohu, Inc. 2016a.)

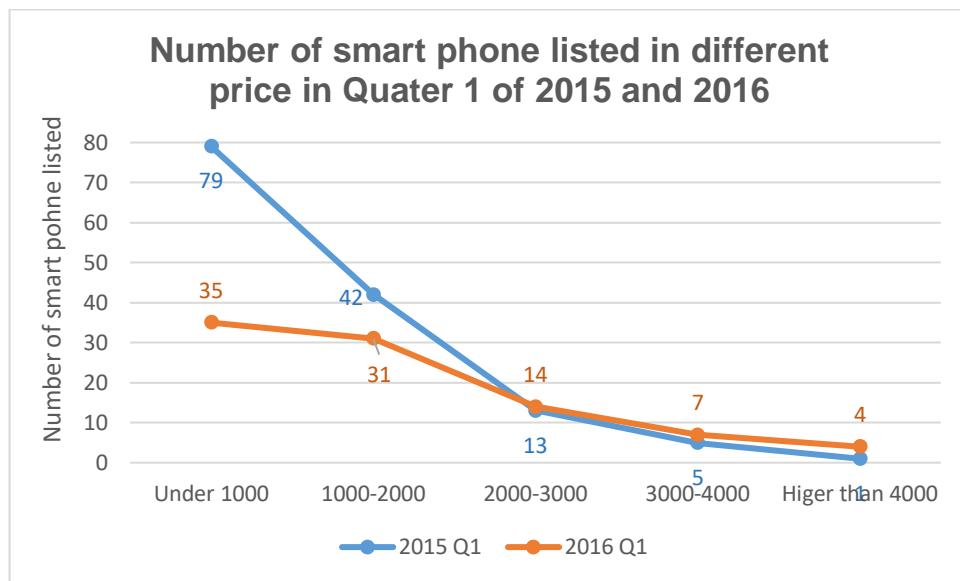
Chinese smart phones top 20 brands sales report of online market for the first half of year 2016							
Brand	2016Q1	2016Q2	2016Q3	2016Q4	2016Q5	2016Q6	Total
MI	2,693,522	2,648,656	2,828,735	2,676,572	2,831,891	3,772,306	17,451,682
Huawei	3,223,978	2,325,544	2,398,599	2,435,334	2,349,911	3,082,441	15,815,807
Letv Phone	681,036	411,837	556,590	1,076,526	1,427,968	1,163,721	5,317,678
Apple	971,778	576,006	716,951	840,489	734,919	1,273,936	5,114,079
Meizu	809,071	843,921	629,306	716,721	707,487	1,025,250	4,731,756
360	412,790	432,929	501,967	462,557	351,665	328,450	2,490,358
Samsung	329,674	205,022	323,143	300,746	270,350	402,169	1,831,104
Smartu-san	256,786	297,042	242,867	131,999	50,808	42,245	1,021,747
OPPO	122,393	85,404	155,421	181,963	174,788	255,303	975,272
Lenovo	127,908	110,520	118,105	129,445	113,850	139,218	739,046
vivo	124,245	85,307	118,723	104,384	159,761	145,868	738,288
Xiaolajiao	106,003	109,661	120,663	106,930	115,178	132,061	690,496
ZTE	115,957	96,806	97,670	104,957	98,451	125,403	639,244
Coolpad	48,631	34,852	44,392	43,391	47,531	39,440	258,237
Oneplus	30,317	25,285	19,200	10,333	4,701	57,828	147,664
Meitu	19,252	20,755	16,941	21,460	16,569	42,392	137,369
Gionee	19,628	11,326	14,834	18,355	15,451	21,581	101,175
ASUS	27,341	14,047	13,588	15,777	7,823	6,878	85,454
ZUK	6,281	14,633	16,750	12,429	6,998	26,286	83,377
Motorola	10,871	8,238	16,702	16,228	18,262	13,000	83,301
Others	129,911	74,033	113,854	139,071	128,173	125,902	710,944
<b>Online market</b>	<b>10,267,373</b>	<b>8,431,824</b>	<b>9,065,001</b>	<b>9,545,667</b>	<b>9,632,535</b>	<b>12,221,678</b>	<b>59,164,078</b>

By the end of June 2016, for the past 6 months, there were 112 brands and they sold 238 styles of smart phone in the Chinese market. Comparing with 317 which is the number of the same period of 2015, it has a 33% decrease. (Qiu & Xi 2016.)



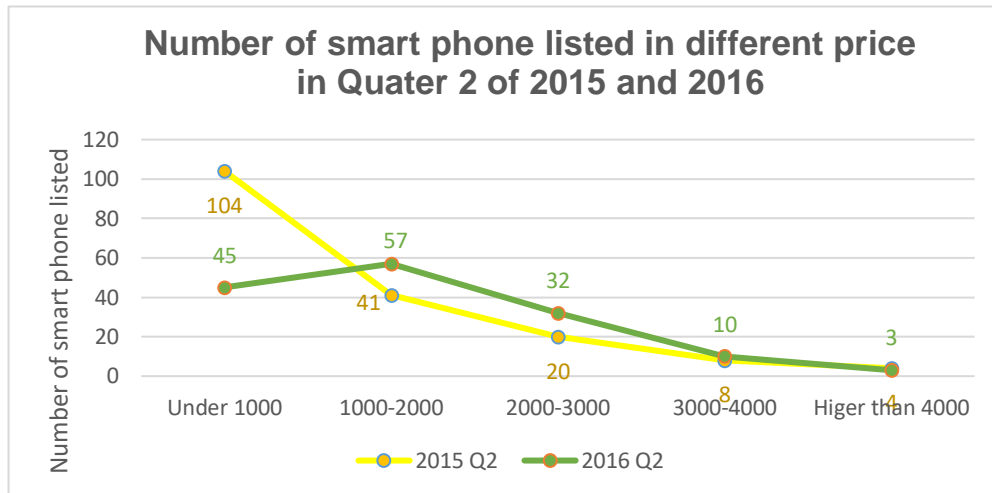
Comparing the first quarter of 2016 and 2015, the number of new phones at the price under 1000RMB was developed 39 in 2016, which is half less than 79 in 2015. While at the price between 1000 and 2000, the new phones just came a little down, it was 31 in 2016 and 42 in 2015. Between 2000 and 3000, it was nearly the same, the one of 2016 is 14 and the one of 2015 is 13. But the number of new phones was increasing which has the price more than 3000. Between 3000 and 4000, 2016 was 7 and 2015 was 5. About more than 4000, 2016 was 4 and 2015 was just 1.

Figure 1. Comparison of the number of smart phones listed in different price in quarter 1 of 2015 and 2016 (Qiu & Xi 2016.)



About the second quarter of these two years, in 2016, the new phones had an increase compared to 2015. But the price under 1000 was still half to 2015, 2016 was 45 while 2015 was 104. But the price between 1000 and 2000, it had a higher increase than the past years, it had 16 more in 2016 than 2015. And the price between 2000 and 3000, it had 12 more. The phone in the market becomes increasing in the high price segment.

Figure 2. Comparison of the number of smart phones listed in different price in quarter 2 of 2015 and 2016 (Qiu & Xi 2016.)

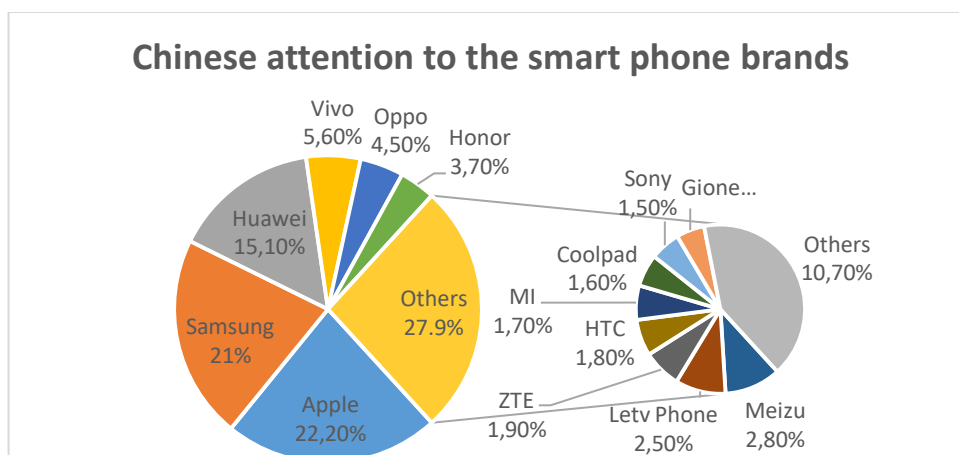


While by the comparing, at the price under 1000, the number of new phones is coming down. And at the time that the full number is decreasing, the number in the middle and high market still has an increase, especially in market of 2016 the price of Q2 is between 1000 and 3000. It shows that the smart phone has become universal and users' quality is higher and it has influenced the market.

After talking about the new style phones in the market, I will talk about the difference in the Chinese attention to different brands who made them.

In 2016 the Chinese attention to the smart phone can be distributed like this. Apple is 22.2%, Samsung is 21%, Huawei is 15.1%, Vivo is 2.6%, Oppo is 4.4%, Honor is 3.7%, and others are 27.9%. While to others part, Meizu is 2.8% and Letv Phone is 2.5%, Lenovo is 2%, ZTE is 1.9%, HTC is 1.8%, MI is 1.7%, Coolpad is 1.6%, Sony 1.5%, Gionee is 1.4%, and others are 10.7%. It can be shown more clearly in the pie chart.

Figure 3. Chinese attention to different smart phone brands (Qiu & Xi 2016.)



The whole Chinese smart phone market shows following characteristics.

First, the upgrade of consumption leads to the average price of smart phone rise. Now most Chinese already have the smart phone at hand, the market has changed from the rigid demand to the one lead by the interesting and hobby. It makes the manufacturers to have improved the quality, design, service, after service and so on to attract more customers.

Second, domestic manufacturers has held more and more percentages in the market. Huawei's sales in the first half year of 2016 has become the first in Chinese market.

Third, manufacturers who had focused on the 1000RMB price market are escaping from this. Because now the Chinese are not satisfied with just having a smart phone, they need the smart phone with high speed, high memory, and high quality in camera... Manufacturers need to improve the phone. With improving, the 1000RMB price market will be smaller and smaller.

Fourth, offline market has recovered in 2016, so middle and high brand need to develop more in this part while improving the phone itself.

Fifth, the consumer has changed from going after high configuration to reasonable configuration. They do not think higher memory is better, high pixels is better, higher cell capacity is better. As getting all things in one phone will make the price much higher, customers will more like to buy a smart phone with settings, which are enough for their daily use at a reasonable price.

(Qiu & Xi 2016.)

With so many smart phones sold every day, what are Chinese using them for? It is used for sending mails, receiving money, searching news, playing games and so on. All the actions are needed to be done with different applications, so what kinds of applications are Chinese using now?

### **3 Applications that Chinese are using now**

Nowadays, we want to have the smart phone with high speed, high memory, high pixels in camera and many other requirements, because we want to upload the images to applications more clearly, to watch videos on applications more quickly, to receive the red envelope on applications more effectively... All we want is for better using the applications, then how many applications Chinese are using, which is the popular applications through all. Let me introduce them to you.

In the past 2016, there are thousands of applications come to the app store. I will show some categories.

#### **3.1 Video Applications**

There are so many video applications. One is the video player, like QQ Live the player which is produced by Tencent, IQIYI which belongs to Baidu, Youku which has been purchased by Alibaba Group and Letv, sohu TV, most of them have their own websites. Because phone becomes smarter and it can surf the Internet and can do more things, these websites all develop phone applications to get more customers. One is live and interactive applications, like 9158 live, KK, YY live and so on. In recent years, live programs are becoming more and more popular in China. So this kind of applications is becoming more and more in number. And the other is short video applications, this kind of applications are taking some short videos with it and sharing them with other users, most of them are about interesting video which makes others laugh, like Kuaishou, Meipai, WeiPai, Xiaokaxiu...

#### **3.2 Music Applications**

Since the phone has the function of listening music, it becomes an important instrument to listen to music which has been instead of MP3. So music applications are also popular in the app store. In China, we are using KuGou music, QQ music, Kuwo music, Baidu music, Xiami music...

I think broadcast applications can also belong to this category. It has Douban FM, Duomi FM, Ku FM, Lizhi FM and so on. This kind of FM applications, you can subscribe, share, like and even download the program. It makes you easier to listen to broadcast at any time you want.

You listen music by applications, you can also sing by applications to let others listen to your voice through them, like Changba, Aichang, Kmi... They all make you sing by phone like singing in karaoke.

### **3.3 Image Applications**

Nowadays, we don't like to send original images to others, because it's not beautiful enough. The camera on the phone has higher and higher pixels makes the photo show many shortcomings. At this time we need applications to pretty image. Popular prettying image applications in China are Autodesk Pixlr, B612, Fotor, Meituxiuxiu, and Haibaogongchang...

Prettying image is not enough either to many users, they'd like to have a more special photo, then we need some camera applications, like Moman camera that we can have carton photo, Huazhonghua camera which we can take photos like picture-in-picture, Meizhuang camera you can take make-up photo even you haven't makeup and any others like Camera 360, Meiyan camera...

There are also some image applications for image sharing where you can show the beautiful and funny images. Like In, Bii, Huaban, and Shijie.

### **3.4 Social Applications**

Social applications are the most popular applications in all applications. On the phone, you can without other applications, but you must have social applications.

Some social applications are used for talking with family and friends and sharing photos and links. Like QQ, WeChat, and Renren. Some offer you the opportunity to make friends with strangers nearby or the one you choose like in the application, like Momo, and Tantan.

Some social applications are more like BBS, forum. The popular applications are used by Chinese are 19Lou, Baidu Tieba, and Tianya.

Some social applications are especially used for you to find your lover, like Baihe, Zhenai, Jiayuan...

### **3.5 E-Business Applications**

More and more people are like to buy goods through the internet, as it is more convenient and more global than the normal market sell. With the applications, we can buy things at anytime and anyplace from all over the world. About this kind of applications, the most well-known is Taobao, which belongs to Alibaba. There are also some others we Chinese like to use, like Gift Talk, M6go, Higo, and Red.

About the E-business applications, it not only means these B2B, B2C or C2C applications, there is also another kind of application, it is the third-party payment application, like Alipay and Baidu Wallet.

### **3.6 Reading Applications**

We seldom read the newspaper now, we are more like to get the real-time news from the web. So the applications about updating native China and abroad news is a good choice. Like BBC News, Baidu News, Global Times, and People's Daily are all applications about news.

Another kind which is also popular used when we are on the way to work is the reading application. We like to use it to read novels. On the way to work, we not only use the phone to read news, playing games, some also like to the novel they are following every day.

### **3.7 Healthy Applications**

As now more and more people realize that health is the most important thing in our lives, and doing sports is one of best choice to keep healthy. The sports applications become more and more popular. In this kind of applications, it has the one teaching yoga, recording data about your speed, time and your distance while running and biking, calculating the calories of the food you like to eat in the meal. In fact, you can find all things you need about fitness in different sports application. Like Yuedongquan, Gudong, Keep, Dongdong...

There is also another one which helps to lose weight. It records your weight and some other data about yourself and your wishing weight, then it makes a good method to help make a plan about what to eat and how to do sports for losing weight. It is really good selection for the women who are talking about losing weight every day. Like Qing plus, Huolajianshen, Bohe, Shoushou...

There is also one application about how to live healthy. Like Jiankangyangsheng, Yangsheng badian...

### **3.8 Browser Applications**

Even every phone has its own browser, but we still like to use the one we are familiar with. So QQ, UC, Sogou, 360 browsers are mostly used in Chinese people's phones.

### **3.9 Trip Applications**

Nowadays, cars are more and more on the roads of China, so it takes more and more time on the way to work. And also because of the price of gas keeps rising, the applications about carpooling cars and renting cars are more likely to be used. Like Didi Taxi, DIdapinche, UCAR...

There are also some other kinds of applications: applications about input method, like Sogou, Baidu, QQ, and Google spelling method; applications about safety, like 360Mobile Security, Tencent Mobile Manager, and QQ Security Center; applications about office, like WPS Office and EVERNOTE; applications about financial, many banks have their own apps, such as China Everbright Bank, Bank of Communications, and Bank of China Limited; applications about logistic, education, take-out, job offers, housing, medical, food, traveling; and many others.

There are thousands of applications in the app store, and tens or hundreds of applications on our phone. We use them every day and night, are they all safe? What we should do if it is not safety?

We are caring about the security of the phone and the applications. But how can we say it is security or it is not security. In which situation we can define it as not security. We need to know the computer security first as the smart phone is also a kind of computer.

## 4 Computer security & Research methods

Smart phone nowadays is a computer device. So what does computer security mean?

Computer security, security can be defined as the state of being free from danger and not exposed to damage form accidents or attack, or it can be defined as the process for achieving that desirable state. The objective of information system security is to optimize the performance of an organization with respect to the risks to which it is exposed.

Risk is defined as the chance of injury, damage, or loss. Except for the possibility of restitution, information system security actions taken today work to reduce future risk losses. Because of the uncertainty about future risk losses, perfect security, which implies zero losses, would be infinitely expensive. For this reason, risk managers strive to optimize the allocation of resources by minimizing the total cost of information system security measures taken and the risk losses experienced. This optimization process is commonly referred to as risk management.

(Bosworth, Kabay & Whyne 2014, 12.)

So it means to keep the information system security, we need to do something to prevent the loss or the damage of the system and the data, which is the risk management. To do the risk management of the applications, we need to know the risks we met now and the measures to manage these security risks.

To know the security of the applications, I first asked many friends in China about their thinking while using some popular applications, and what kinds of problems have they met yet. I also downloaded some applications to have a look by myself, and then searched a lot of information about these applications and their security.



## 5 Mobile phone security

Nowadays, the smart phone is not only a tool for making phone calls or sending text. It is also a kind of computer, we use it for buying goods, doing job, sending email, and so many other things which we just can do through the computer. It is used in everyday of our life, we type in so many privacy information and so many working information. Have you ever been afraid of losing them while you use the smart phone?

A report from Tencent shows that 50% users think their using environment for the smart phone is safe, and 21% users think there is still improvement; 61.8% IOS users think their smart phones are safe, which has the highest evaluation, only 43.9% Android users think their smart phones are safe. And the real percent of users who have faced the malicious software, Trojan virus or other security problems to the whole users in these two systems are 23.9% for IOS and 37.2% for Android. (Tencent Technology 2016.)

So many users are worried about their smart phone safety, what problem makes them think so. The following parts I will show some problems that are commonly faced by Chinese smart phone users.

### 5.1 Free Wi-Fi steals personal information

The Smart phone is also a computer, it is the preferred targets of attacks. The weaknesses coming from the means of communication on the smart phone are used by the attackers to steal your information. Like Short Message Service, Wi-Fi, Bluetooth and GSM.

From CNNIC reports, the number of Internet users has been 710 million and the number of mobile internet users has become 656 million by the end of June in 2016 (China Internet Network Information Center 2016, 1). And in the mobile internet users, there are a large number users choosing to connect the internet with Wi-Fi. As Chinese use 3G or 4G offered by the communication company is counted by data. It has many plans like 500MB, 700MB, 1GB and more data for one month using. Nowadays, for the smart phone using, the 500MB maybe the least choice. But it cost 30RMB already. (China Mobile) So Chinese are more like to use the Wi-Fi for phone connecting the Internet.

How do they steal the information by Wi-Fi? Some attackers fake their own Wi-Fi as the free public Wi-Fi. When you connect your smart phone to it, you do some operation through the Internet. They can get your information from it easily during this time. Then they can get your email ID and password, the contract you make on the phone, the report you make, the photo taken by the phone, and many other accounts and their passwords.

So to avoid this problem, we'd better not to connect with Wi-Fi, which is free and does not have a password, and it's better to use these have a password provided by the shops. And when you want to send emails, logging in the social applications, and paying on the Internet, you'd better stop the connection with Wi-Fi, and to change to use 4G to do it. (360 engineer 15 March 2015.)

## **5.2 Harassing calls and spam messages are used for cheating money**

Starting from the records of 360 safeguard which is an application to prevent spam messages or losing information and so on, there are 262 million harassing call numbers in 2015, it means there are 1 million numbers are recorded by users as the harassing call number in one day. In these calls, there are many types: 37% are the calls which ring only once, 15.1% are advertisements, 9.5% are cheating calls, 8.4% are from housing agency, and 5% are about insurance and financial management. (Qihoo360, Inc. 2016) In 2016, the recorded harassing calls are 234 million, the calls which rings only once are 54.6%, advertisement calls are 8.4%, cheating calls are 9.3%, housing agency calls are 3.0%, and insurance and financial management calls are 2.4%. (Qihoo360, Inc. 2017.)

About some advertisement calls, we can easily find and record them with the safety applications to prevent them calling again. But how about these cheating calls, not everyone can recognize them and now they even fake as police or procurator to ask users to transfer your money to the account they offered. As they said your account is not safe now, you need another safety account or they may say you need to pay some guarantee, many pretexts and some other ways to ask you to pay money to their account. To solve this problem, you need to go to the relevant department to know the authenticity about this thing, and then do the following things, not to send money first. And using some safety application to record them to prevent you getting the calls again and others receiving the same calls.

In 2015, 360 safeguard had intercepted 31.83 billion spam messages, and whose 7.1% are fake as the mobile base station, 91.9% of them are advertisements, 4.3% are cheating messages, and 3.8% are illegal messages (Qihoo360, Inc. 2016). In 2016, 360 safeguard had intercepted 17.35 billion spam messages, and whose 4% are fake as the mobile base station, 92.2 of them are advertisements, 2.8% are cheating messages, and 4.2% are illegal messages. The total number of the spam messages has been decreased nearly 45.5% according to 2015. (Qihoo360, Inc. 2017.) These advertisement messages are mostly about the communication company, financial management, bank promotion and many others. These cheating messages, most of them are camouflaging them as the

bank and communication companies, they think some reasons to ask you to transfer money to their account. The illegal messages are like gambling, and making fake document.

To solve this problem, about illegal messages, disregarding them is enough. About the cheating messages, if we are really cannot recognize the reality of them, we can make the phone calls to the bank to make sure. Of course the number you call cannot be the number the message wrote, but the number you get from the certified website of the bank. And if it needs to call back, it's better to call back with fixed telephone to prevent to pay more phone bills if you use a mobile phone. About the advertisement which said they sell goods with low price, just go and have a look in the shops. If it is true, have a good shopping time; if it is not true, having a look does not make any loss to you.

### **5.3 Smart phone virus to steal information**

In the first half year of 2016, users infected the phone viruses are more than 200 million, and the number is increasing every month, the number of June 38 millions can be the sum of 6 months of the 2013 first year. And the viruses are increased by ten millions every month, in 2016 first half year, there has increased 9.18 million. In these viruses, the virus about the payment is most dangerous and spreads so fast. Every month there can be 2 million users get it. And this kind virus has increased 320 thousands in these 6 months. (Tencent 2016.)

How can we get so much virus? When we download games or some other applications from any unsecured web, the malicious applications are also downloaded to our smart phone at the same time. They have virus to steal information, to cheat money, increasing fees and so on.

To solve this problem, it is better to download applications from the standard app store, and download some safety applications to monitor your smart phone.

In sum, if we want to make our smart phone safe, we need to reach the following requirements:

- Set your password as the mix of letters, digits and punctuation. And do not use the same password for many applications.
- Do not connect with free Wi-Fi that it doesn't have a password. And when sending important emails or paying fees with the phone, stop Wi-Fi connection to use 4G.
- Surf the secure web and kill virus in a fixed time.

- Download applications from the security app store and read the agreements of the applications and be carefully while registering online. It can help you know whether the web will protect your privacy or not and also shows whether there are some extra applications downloaded together.

While ignoring the harassing calls and messages, using the 3G or 4G on going and use the protected Wi-Fi, will we make sure the security of our smart phones? The answer of course is 'NOT'. As you have forgotten the applications you are using now.

## **6 Main popular applications used in China and their security**

We talked about so many applications upside, what are the most popular applications Chinese use? A list of the top 100 application used in 2016 September shows the top 10 are as follows. The 1<sup>st</sup> is WeChat which has 717 million active users, the 2<sup>nd</sup> is QQ which has 555 million active users, the 3<sup>rd</sup> is Alipay which has 280 million active users, the 4<sup>th</sup> is Taobao which has 252 million active users, the 5<sup>th</sup> is QQ Browser which has 202 million active users, the 6<sup>th</sup> is QQ Live which has 197 million active users, the 7<sup>th</sup> is IQIYI which has 194 million active users, the 8<sup>th</sup> is Tencent Mobile Manager which has 193 million active users, the 9<sup>th</sup> is Baidu Search, and the 10<sup>th</sup> is KuGou Music. (Askci 2016.)

### **6.1 WeChat**

WeChat is an instant messaging service. It is released in 2011. 1. 21 by Tencent Company (NetEase 2014). It supports sending hold to talk voice messages, text messages, broadcast messaging and video conferencing through the Internet crossing operators and platform; it can be used to share videos, photos and location on the plugin services; it can make friends nearby; and it can be used for paying bills too.

The project of WeChat starts in November 2010 by the Tencent Guangzhou Research and Project center. It released WeChat test version 1.0 in January 2011, WeChat just can lead in contacts through QQ account to send messages, share pictures, change avatar and do some simple operations. In May 2011, WeChat released version 2.0 which appended voice messaging, it made active users increase markedly this time. (NetEase 2014.) In April 2012, WeChat released Moments, register users were more than 100 million. In September 2012, the register users have reached 200 million. (Li 2013.) In March 2015, the monthly active users has reached 500 million (Millward 2015). In March 2016, the monthly active users has reached 700 million (Custer 2016). And now it has reached nearly 1 billion monthly active users, it has been 963 million in the quarter 2 of 2017 (Lee 2017). Now WeChat is forming a new smart way of life with cooperate partners, which makes users easily to do shopping, pay the electric bill, take a taxi, and book hotel...

#### **6.1.1 Service WeChat offers**

##### **1. Instant Messaging**

The basic service of WeChat is instant messaging. It supports different ways, like text message, voice message, and walky-talky. It also can be used to send saved pictures and videos and also the live ones. Users can also send lucky money packages, name cards and current locations with friends.

## 2. Moments

In the research of 2016 WeChat users, it shows the moments is the service that has the highest frequency use. 58% users use it every day. And about 61.4% users will refresh moments every time they log in WeChat. The people who have never had a look at the moments is only 1.3% of all. (Penguin intelligence 2016, 16-17.)

Users can post text and pictures, share articles and music, and users can also make comments and “Like” to the text. But you can only see the comments or “Like” from the people who is the friend of both you and the poster. It can most share 9 pictures at once, and can share with text together with the picture. About videos, it can only share the small videos whose longest time is 8 seconds. The text cannot be shared or kept by friends, it also cannot show location and @ function.

In these post information, users have more concern about friends’ condition of life, and less attention to these forward information. And they are more like to see pictures, texts or short videos than these articles links. While viewing these things in the moments, what else will the users do? They are more like to add “Like” to their friends or comment to them than posting something by themselves or transfer the moments of their friends. (Penguin intelligence 2016, 18-20.)

The moments also has an important use, it is to do business. Now most people like to do some advertisements on moments.

Moments has become the most important function of social life.

## 3. Official Accounts

WeChat offers users to register as official accounts, which enables companies to send text, pictures, videos about their new goods, new services like having discount, how to use their goods and so on to the people who has followed on it.

While it has this service in WeChat, we can see many two-dimension codes in the shops we are looking. If we add their official accounts, we can have some discounts, and even can get a membership of the shop. After customers add the official accounts, they will send some information about company, goods, discount and many things to the users to attract them to know more about the company and further to buy more from them.

It has become a public way for company online and offline marketing.

#### 4. WeChat Pay

WeChat Pay is a digital wallet service incorporated into WeChat, which allows users to pay money to shops and to send money between users. It makes users to have a fast and efficient paying service by combining it to the users' debit card, you just need to input the password then the paying is made.

Now WeChat Pay offer official accounts paying, APP paying, two-dimension codes paying, debit card paying. The official accounts paying, after you buy goods, you pay on the company page. The APP paying, in the app that you need to pay money, you choose pay by WeChat, then starts WeChat to pay. The two-dimension codes paying, the person who sells the goods will send you one two-dimension code, after you scan it, then you can pay. The debit card paying, is the shops will scan the bar code the customer have on the phone, then finished paying. The survey about the paying per month by the WeChat Pay shows that comparing with 2015, there are more turnover in 2016 (Penguin intelligence 2017, 19).

Nowadays, people are more like to take only a card and a phone with them every day. So the mobile pay is more and more popular used even in the offline market.

#### 5. Other services

Services for life, like charging your mobile bill; donating to commonweal; paying for electricity, water, gas, internet and so on. Services for reading and sports, special discount voucher wallet are also the service of WeChat. In the research WeChat made, 62.2% of the whole people who had taken part in the research have used the service for life and the charging for mobile is the most used function, 47.1% had used it. 19.7% had used the special discount voucher wallet. 15.3% had used the service for sports, 15% had used the commonweal donating, and 6.1% had used the service for reading. (Penguin intelligence 2017, 34.)

#### 6.1.2 Security

WeChat has so many functions, more and more people like to use it or it can be said like this, more and more people cannot live without WeChat. We use it every day. But some problems come out also, one of the most important is the security problem, especially when we have connected the account with the bank card which has money inside.

WeChat itself has its own measures to protect the user's security. It is backing up the big data of Tencent, with the big data and cloud computing to judge whether the paying of the user is safe or not. And when you connect your account with the bank card, you can set

one paying password, as long as you pay money by it you need to type in the password. The password can be the normal one, it also can be gesture and fingerprint that are hard to be stolen by others. And Tencent has developed the application Tencent Mobile Manager to protect the whole process of paying. The last WeChat promises they will compensate when the user is stolen by others and WeChat has the responsibility.

While the application itself has its own measures to protect the security of it, what else we need to take care to protect ourselves.

#### 1. Caring about the friend made on WeChat.

WeChat has the function to search the people who also use WeChat nearby to make friend. Making friends in this way has some risks, there may be some criminals inside. After making friends, the criminal may ask to have a real meet outside, then robbing or even murdering may happen. So when making friends by this way, you need to be more careful. And when you receive the message to ask for having a meet, you'd better have a think first whether you have known him well and really want to meet him, then go to the meeting in a public place where has many people around to make sure there are some one you can ask for help, and it's better to tell your family members or friends to know where you are going and whom you are going to meet. But it is better not to accept this kind of friends, set the process of adding friends with some identifying and pipe off these people you don't know.

#### 2. Caring about getting cheated through WeChat.

Now, there are more and more cheating methods coming out with the high technology product developing. Like the time when the phone only has simple functions calling and sending text message, the swindler calls the user to tell him he has won a prize and needs to send the taxes first to the account he told you then you can get the prize. Or the swindle act as user's family members to cheat, they send messages to the user that they need some money and their cards are not working, then tell you a new account to transfer money. With these cheating methods are explored by TV and newspaper, more and more people know about it, so less and less people believe in it or be cheated by it.

But with the phone becomes smart phone, more and more applications are developed, the cheating methods also become more and more. Just on WeChat, there are some different methods to cheat.

First, one simple case in WeChat is that swindle changed his user name on WeChat, and fake the function AA collection as red envelope. While AA collection is one application of



WeChat Pay, it is for someone collect everyone's average money for the event. But because he has changed his user name which you will misunderstand that you can receive a red envelope. And then you give money to him. (Sohu, Inc. 2016b.) This is the simplest one and can be easily penetrated, because receiving red envelopes on WeChat you do not need to press password, but transferring money needs the password. Receiving a red envelope is a happy thing, but first you should have a look whether it is a real one.

Second, cheating on WeChat Moments is another way. Moments now is not the simple place for you to state your mood and mind, it also becomes the place for goods' advertisements or some information about delegated purchase. When we refresh the moments now, full of the screen can be these advertisements. This customer to customer business is a fast and simple way for shopping, but it also has swindlers in them. One real case of my friend is that she knows one 'friend' from a real friend. This 'friend' engages in delegated purchase on WeChat and says he can buy from abroad. One day, he showed a bag which also has a high price, but it is lower than it in China, so she bought it. But when she received the bag, she found it is a fake one. So she connected with him to return it, but just get one rejection. After discussing many times, he even pipe off her. In this kind of cases, it is hard for police to do some real actions, as these people sell goods on WeChat, most are simple people without any commercial registration. So when you are in this situation, what you can do is to report and complaint to WeChat, they will punish these accounts as long as they have been verified. Having a lower price to buy things is good, but buy from the person you really can believe in.

Third, cheating is not only happens to these customers, but also to these traders. One case is like this, the customer said his red envelope and the money he can transfer on WeChat had reached the limit, so he asked the trader to give him the two-dimension code which is another way for paying on WeChat to let him pay through scanning it. And after the trader sent the real two-dimension code to him, he said the trader had sent the wrong one and asked him to send another one. While there are two choices in one list, one is to receive money from others and the other is to pay money to others. The swindler mislead the trader to let him send the paying code. After he received the paying code, he got money from the trader's account. (Sohu, Inc. 2016b.) So when paying or receiving money, you first need to have a look whether you have chosen the right code.

Forth, another way is that the swindler clone as friends to cheat. One case is that one accountant of a company is added into a chat group by 'CEO' and in this group there are also other 'colleagues'. And after some short talking, the 'CEO' asked the accountant to send 870,000RMB to one account. She did it, but the 'CEO' and the 'colleagues' are not

the real ones, they are the swindlers, they copy the name and the head portrait of the real people to cheat her. (Sohu, Inc. 2016b.) This case happens, because WeChat do not need real name and you can have any nickname, anyone can clone you by changing the name and the head portrait to yours. It cannot tell the difference from the account. And adding a person to a group in WeChat doesn't need his agreement. The swindlers inveigle the victim to the trap one step by one step. This kind of clone also happens by faking as your friend to borrow money from you and so on. In this situation, especially when the transfer of the money is too much, it's better to ask the person asked money by face or by calling. And you can make some remarks on the friends. The swindler cannot know your remarks for everyone.

Fifth, there is also one way is to steal your WeChat account first, and get some available money from it. Miss Lin received one message from her friend. It said he lost the phone so the contacts also missed, he needed her phone number. Miss Lin sent him her phone number. But one minute later, he sent another message that it needed the identifying code from friend to log in his WeChat. So Miss Lin sent the code she received from WeChat. Then she found that she cannot log in her WeChat. And after getting the account back, she found she had lost some money already. (Sohu, Inc. 2016b.) How does he do? While it's very simple, you know that your phone number is connected with the WeChat account, and it also can be used as the user name to log in. So the swindler logs with your phone number and presses the button of forgetting passwords, and then WeChat will send one identifying code to your phone by SMS. You tell him this code, then he can easily log in with your account. So do not easily tell others about your identifying code. And it's better to set another password for your WeChat wallet.

Sixth, buying goods with 0 by bargaining from friends is another gimmick to cheat you. Miss Wu attended this kind of event by one official account, it needs friends to browse the website they offered. The more friends you asked to browser it, the less money you need to pay. So Miss Wu asked lots friend to help and get the price of 0, but she didn't get the goods. (Sohu, Inc. 2016b.) Why? She got the replying that the goods of the event is only 5. This kind is only one marketing strategy, so reading the message carefully first. Like this, they told you there are no more goods as it has a limited quantity, I should congratulate you. As there are some swindlers may use this kind of gimmick to fob customer off with fake goods or just receiving money from customers without sending any goods. Of course, there are some real event on WeChat also. So making sure whether the event is true or not before attending it is really important.

Seventh, gifting free trial goods of big brand is also a gimmick to cheat. They always say like this, they hold an event of sending free goods of big brand for marketing, you don't need to pay any money for the goods, and you just need to pay for the postage after receiving. But when you receive the goods, you will realize you are cheated, the goods is only a fake one, not like they said it is the goods of big brand. And the money you pay to the courier is not the postage, it is still the payment for goods, just collected by courier. For making you believe it, they always set some countdown and show the list who has got the goods. In this kind of atmosphere, you may easily get into the trap, and be hurry to make an order as you afraid you will miss the time. So when see some messages like free this, think about this proverb 'There is no free lunch.' first.

Eighth, swindlers even use 'love donation' to cheat. A leukemic girl, Miss Huang ask one official account which shows as a commonweal organization for help on WeChat. As she cannot hold the whole price for the hospital. And the account looked like very professional, they asked her to provide some information like medical reports, picture of identifying card and hospital information. After checking these documents, they asked her to write one article to send to them with her personal two-dimension code to receive money from donors. At the time when everyone donates and forwards energetically to help this unfortunate girl, her classmates felt something was wrong. They found the receiving account is not the account of Miss Huang. And what's more, there are tens of classmates donated to her, but she had just received from 9 classmates. After investigation, the company that registered the account was a shell firm. The money donated was missing, and the company is missing too. (Sohu, Inc. 2016b.) We want to show our love to others is good, but we should treat this love donation reasoning. We should check whether the organization who originates the donating is regular or not.

### 3. Caring about losing personal information.

First, get gift by scanning two-dimension code is a new way for getting your personal information. As most people think that we can scan the code to get the gift first, after getting the gift you can delete it. In this process, you think you have no loss and get something. Is it really like this? Of course not. After scanning the code, it may have a link to download Trojan which makes your lost your information on the phone. Watching out this kind of event, if you really want to attend it, you need to choose some ones hold by a big company.

Second, involving in voting match. Involving in the match needs you provide your real picture, name, birth date, phone number and many personal information. It has the risk that your information may be sold by the holder. Not involving in the match, you will be safe.

It's not true. You must have received some messages to request you to help to vote in the match and you can see the link below the message. If you did, you may lose your information either. As it may have Trojan behind the link, as long as you click in, you will download the Trojan. So being prudent to these matches, making sure the holder is reliable is the way to prevent loss. And when you receive messages from friends to ask you for helping with voting in some matches, and you really want to, the thing you need to do is also making sure the holder's qualification.

Of course, the cases showed upside have already happened, you may be cheated or lost personal information in other ways. As the old measures you have known, the swindlers also need to think more new ways. But you just need to remember followings:

- Never tell others your password and identifying code to others;
- Closing your location, not let someone you don't know well get your location;
- Believing in 'There is no free lunch', not believing some event with the word 'free';
- Buy goods from the real WeChat business;
- Read the details of the event and the holder's information carefully before taking part in it;
- When paying money, check the code is the right one. And the two-dimension code paying should only be used face to face.
- If you are still being cheated, let more people know it to prevent more people to be trapped.

If you are getting some security problem and it is about the WeChat, I think what you should do first is to go to the bank and freeze the account you have combined to WeChat Pay. And call the customer of WeChat to get help to solve the following problems. While if it is related to your personal safety, calling the police is always the first thing you should do.

## **6.2 QQ**

After talking about WeChat, the most popular application in China, we start to talk about the second one, QQ which is short for Tencent QQ. It is an instant messaging software service developed by Tencent same as WeChat.

QQ was first released in February 1999 with the name OICQ (Huang 2006, 394). But at the time 2000, when QQ has swept China, Tencent received one lawsuit from AOL who is the owner of ICQ of a trademark infringement. So the owner of the Tencent changed the

name to QQ (Gao 2003). After 9 months, November of 1999, there were already 60 thousand users registered QQ. In April 2004, the users reached 300 million. At the end of 2016, the users have reached 829 million. (Qin 2017.)

### **6.2.1 Services**

QQ as an instant messaging software, it supports text messaging chat, voice-enabled chat, and chat by video, it also can used to send and share documents and so on. It can also connect to different communication functions like mobile communication terminal, which makes QQ become a convenient, useful and efficient instant messaging software. Within QQ account, you can connect with many other services Tencent offers like Tencent. Qzone, which is developed by Tencent in 2005 (Sabrina 2013). Tencent wanted to open one personal network place for users, so in Qzone, you can write your diary, post your pictures, writing on message board and many others. QQ Postbox, offered by Tencent in 2002. QQ Pinyin input method, developed by Tencent in 2007, it has fast speed and occupants less. QQ Game, a community for users to play games like simulation game, chess and card, mahjong, board games and so on.

### **6.2.2 Security**

QQ has been used in China for 18 years and it is one of the earliest instant messaging software, so many users are using it, is it safe, which kind of security problem we may meet on it. QQ's website has showed some cheating methods used by swindler through QQ.

First, acting as family members and friends to borrow money.

The swindler first add you as a friend in QQ, and making video chat with you, at this time he will take a record of your video. And then he steals your account, and then analyze the relationship of you and your friends in QQ. When he finds your family members and friend in real life. He will make video chat with them, and play the video he has taken to them, as he cannot have the same voice of you, he will write messages instead of talking with the rescue that the network connection is bad. And then typing the message to your friends to borrow money. Most of people think that we have had a look of the friend, so it should be truthful and then hurried to send money. This kind of cases always happens to some people whose children are studying abroad. As parents are very caring about their children, especially when the children are not beside them alone on abroad, they may easily get cheated by the swindler.

So when the topic has related to money in chat, identify the person by phone first, and ask the person to do some instant gesture you have just thought. As long as you have made sure he is the swindler, complain to QQ by the button on the window, and tell the account's quondam user that his account has been stolen and go to change the password right now.

Second, acting as an official system to message you to forward your account and password.

As now we combine our phone number with the QQ account to have one more measure to protect our account. So swindler exploits to cheat you. When you receive one message said "he is the QQ system and your phone number used to protect your account hasn't been validated for a long time, you need to forward your account and password back to validate it. After forwarding the message, you cannot connect to your account anymore, as the swindler has changed the password. And it also happens in QQ Postbox.

If you got this kind of message, you can go to the QQ website to make sure whether the phone number is the real belongs to the Tencent QQ or not.

Third, linking you to a phishing website by appealing to you

As in QQ, we don't just have the friend that made in real life, there are also some ones we made on the network. There may be swindler inside of them. They send you messages to appeal to you for finding his missing sister and send you one link to Qzone which has her picture on it. After you click the link he wrote to you, you will move to a phishing website, it asked you to type in your account and password, then you will lose your account either. Well, you may say you don't have strangers in QQ, but you may also get the message. It's from your friends, as at the last of the appealing message must write that 'transfer this message to as many people as you can to help him find his sister fast, thank you'. Because your friend may even think that he hasn't opened the link but if he has transferred the message to many other people, he may do some help to this thing. As long as one of your friends believe in it. You will also get into the trap. It may easily be trusted because it is from your friend.

When you receive the message with a link in QQ, it has some icon shows the website is dangerous or not. You need to check that first. If it is safe, you go to the link, you also need to check the address showed on the web is the right of one. If you still cannot make sure the website is safe or not, type one wrong password to have a check, if you still

logged in, then it is the phishing website to steal your account and password, if it not works, then it may be the real address.

(Tencent QQ)

It has so many cases happened on QQ, but it is still one important software that Chinese need it, what we should do to protect it?

1. To prevent your password stolen, you should not search the dangerous site, and not open the documents without a clear sender; you can apply for the protection of your account, which you need to combine your account with your phone number; you also need to change your password to complex password and change it frequently and avoid using the password on another website.

2. To avoid dupery on QQ, you cannot believe the 'Win Prize' messages easily; alert the imitating customer service's phone, the calls ask you to send money are all swindlers; the link to an outside website, you must watch out the address to make sure it is not a phishing website.

3. Downloading the software, QQ Security Center developed by Tencent to help protecting the whole QQ.

### **6.3 Alipay**

Alipay is a third-party online payment platform. In 2003, Taobao first provide this service. And in 2004, Alibaba Group separated the company from Taobao. (Alipay 2003&2004.) Now Alipay has more than 450 million users and the active users can be 391 million. (Southmoney 2017; Analysys 2017.) It has 710 million transactions in double 11 shopping carnival of 2016 (Alipay 2015). And now it has more than 180 partners, they are banks of China and abroad, and organizations like Visa and MasterCard.

#### **6.3.1 Services**

1. Doing shopping.

The Alipay was first proposed by Alibaba to make the buying process more safety in Taobao, so doing shopping is the most important service it offers. Now, more and more shops and even the taxi can use Alipay to pay the money.

It can be used on abroad website to buy goods, like iherb, windle, Forever21, aoso and so on. And now the abroad shops offer Alipay for travelers from China to buy goods directly

there. Alipay has announced that he had made agreement with 4 financial organizations of Europe to help the consumption of Chinese travelers. (Sina Technology 2016.)

And Alipay can be used for drawback after your travel in some airports, they are Flughafen Düsseldorf International, Rhein-Main-Flughafen, Aéroport international Charles de Gaulle, Gimpo International Airport, Incheon International Airport, Amsterdam Schiphol Airport, Aeropuerto de Madrid, Fiumicino Aeroporto, London Heathrow International Airport, Aeroporto di Milano-Malpensa, and Flughafen Zürich. (Zhu 2014.)

## 2. Repayment.

In January 2009, this service was released. It can repay to the credit card of 39 banks in China (Alipay Service). And in the first quarter of 2014, 76% repayment of credit card is done by Alipay.

## 3. Doing transfer.

You can use Alipay to transfer money to others' Alipay account instantaneously. And transferring money to the bank account of yourself and others can be done by Alipay also.

## 4. Paying fees.

From the end of 2008, Alipay starts to service to pay fees of human services . It has covered 300 cities in China. It can be used to pay for not only water, gas, and electric but also the cable TV, traffic fine, property and many others about our life. (Alipay 2008.)

## 5. Adding other kinds of service account.

You can add other service account under Alipay service window to get the services like checking bank information, booking cinema ticket and choosing the seat, checking the sales information of the train and many other services.

You can pay for goods and services by Alipay, it also offers users many methods to do the process, they are quick payment, pay by the phone's Alipay, two-dimension code paying, NFC paying, iptv paying and fingerprint paying.

Quick payment is that you combine your Alipay account with a bank card and you leave your phone in the bank, then when you pay money, you can receive an identify code from Alipay on your phone, with the password you can pay more quickly than normal one which you need to go to the E-bank first with the U type shield to make the payment and the rate of successful payment is low. But Alipay quick payment makes the rate reaches 95%, which is higher than E-bank's 65%. And Alipay has made insurance for the user's fund, if



there is something wrong, you can get compensation. By May 2014, more than 180 banks have opened this service. (Gaodun 2014a.) It's really a convenient, easy and fast method to pay.

Alipay of the phone, downloading the Alipay on your phone and you can log in with your Alipay account. The whole year of 2016, there are 450 million users use Alipay, and about 71% payment is done by the mobile-client. (Liu 2017.)

Two-dimension code paying, it is similar as WeChat Pay, you scan the code of the trader under the function of paying money. And in July 2011, Alipay first started BarcodePay in Guangzhou, which is suitable for paying in a convenience store (Gaodun 2014b).

Fingerprint paying is a payment measure which makes the payment safer and more convenient.

### **6.3.2 Security**

Buying this and that here and there online, is it safe? We pay money so easily, will the thief steal money or personal information easily either?

Since 2010, Alipay has united with many security software companies like Tencent and Sogou, browsers, and banks to oppose a phishing website in real time. And also cooperate with abroad companies like MarkMonitor, Netcraft, TrendMicro, and MicroPoint stop the connection with the abroad phishing website. In 2013, Alipay stopped 150 thousand phishing websites. (Wang, X. 2014.) And Alipay has put much money into the security anti phishing website, Trojan, money laundering, and to protect personal information.

With these methods Alipay has done, can we use it safely? Of course, NO. To protect your own money and information, you also need to take some measures or at least know some cheating ways that swindlers always used by Alipay to prevent you from being trapped.

There is a case happened recently, one person act as one university student said he had lost his purse so he borrowed money from other passengers and promised to return back the money by Alipay immediately. People thought that he would return money by Alipay immediately, you don't have any loss and can help others. So many people helped him. But he is a swindle. (CCTV news 2016.) How did he do? He made the process of transferring money to the sufferer, and show the page to her, but she found she didn't receive the money immediately and asked the swindler, the swindler told her because of the internet

connection near the train stop was bad, it needed more time. As the victim hurried to take the train, she didn't wait for the money. And she thought the process of payment had been done, but it just hasn't shown in the account, so she left. But she doesn't know that the page he showed is not the final page which shows successfully transfer but the page during the process. You want to present love is good, but need to take care. In this case, nothing relates to technical matters, so no matter how much Alipay has done to protect its software, it cannot stop you from cheating. You can only take care by yourself.

Well, there are also some other kinds of swindle. Like acting as the customer service to ask you provide your password and the bank card information which has combined to Alipay. Downloading the Trojan by scanning the two-dimension code is also one kind. To prevent ourselves trap into the swindle, what we should do or should take care?

- The logging in password and the paying password should be different, and the password of the phone and the Alipay also should be different.
- Combine the Alipay with your phone can help protect the safety of the account.
- The bank combined to the Alipay should leave your own phone number, never let others help you to open a bank card.
- The ID, bank card number, password and especially the identifying number sent by the phone cannot be told to others.
- Do not click the strange links or documents.
- Alipay only has one customer service phone number, it is 95188, not believe in others.
- The Two-dimension code should be used only face to face.

#### **6.4 Taobao**

Taobao is a Chinese online retail shopping website. It is founded by Alibaba Group in May 2003 (New aristocracy 2015). At first, it just facilitates customer-to-customer (C2C) retail by providing a platform for small businesses and individual entrepreneurs to open online stores.

With the expanding of the scope and the increasing number of the users, now it has changed from the simple C2C website to an all-around retail platform including C2C, group purchase, distribution channel, auction and so on. It has been a world e-business platform.

After it is founded in May 2003, the volume of the whole year's transaction reached 34 million and the registers numbers were 230 thousand. In 2005, the volume reached 8 billion. While in 2006, it has become the biggest online shopping in Asia, the volume reached 16 billion. In 2007, the volume reached 40 billion. In 2008, the new business-to-customer (B2C) platform was released, whose name changed to Tmall now. In 2009, Taobao has become the largest comprehensive shopping place in China, and the volume reached 208.3 billion. In 2011, Alibaba Group distributed Taobao to 3 unaided companies, they are Taobao which still focuses on the C2C, Tmall which focuses on B2C, and eTao which is a platform like a shopping guide for the promotional goods from both Taobao and Tmall. (Coke ice tea 6 June 2015; haijiexly 24 June 2014.) In November 11<sup>th</sup> 2012, the double 11 shopping carnival, the volume of Taobao and Tmall has reached 19.1 billion in one day. And in November 11<sup>th</sup> of 2013, the volume reached 35.019 billion. In 2014, the daily volume reached 57.1 billion in double 11 shopping carnival. The day of 2015, it reached 91.2 billion. And in the day of 2016, the daily volume has chalked up a new record, it is 120.7 billion. (Southmoney 2016.)

#### **6.4.1 Services**

It is a platform for retail, the mainly service, of course, is offering Taobao shops to users. The shops have two types, one is normal shop, and the other is hot shop. Every user opens a new shop in Taobao, the system will offer an interface that is the normal shop. While the hot shop is that Taobao offers the technology of computer and network to help them make a personalized interface. To classify by users, the shops can be distributed to three types, the first is the Tmall shops that are offered for companies, like Lenovo, HP, Nike, Adidas and many other brands. It is the type of B2C that is business to customer. The second kind is the shops for the minor enterprises and manufacturers who can manufacture good goods but haven't become an independent brand or have low popularity, so opening this kind online shops helps them increasing the volume of sales. The third is the shops for persons, which is for C2C sales.

The place Taobao has offered. But when doing shopping, customers also need to know more about goods before buying. So Taobao also offers on instant talking software for the users to connect each other, that is trade manager.

Taobao index is a free platform for sharing data. With it, users can know instant shopping tendency. Buyers use it to know the shopping characteristic and the shopping tendency of the same age. Sellers use it know what kinds of goods are best-selling and the customer's characteristic of their own shops to help them to make a more precision marketing plan.

Taodiandian, is a new online to offline (O2O) platform made by Taobao in September 2013 (iwangshang 2015). It is for users to search the restaurants, fruit sellers, cake shops nearby, and then make the orders and pay the money then receive the takeout.

#### **6.4.2 Security**

Taobao also needs to use Alipay to do the payment, so to steal money or get personal information by some swindles are also happening on Taobao. Taobao and Alipay both belong to Alibaba Group, the company has done a lot to protect the safety of the users while using the software, but swindles still happen so we also need to do something to protect ourselves. Here are some cases already happened, let us have a look and take care about them.

First, using a phishing website to cheat buyers. With the success of the double 11 shopping carnival, more and more swindlers use this kind of sales promotions to cheat the users. How do they do? He will first send you one SMS writing like this, for thanking for the customers his company started an event and you win the first prize of this event and ask you to go to the link he offered you first and log in there. After logging in the website, you will see a similar website as the real Taobao website, and it asks you to fill in your personal information including the bank information. If you do as he said, you will lose your information. As the link he sent to you is a phishing website.

Or they may say there is something wrong in the order that you have made, so they need to return your money to your bank account, and then also ask you to click the link they offer you. Of course, it is a phishing website which asks you to log in the website with your account number and the passwords of logging in and payment.

This is also another type of swindle using a phishing website to cheat users. The seller asked you which bank you were using for the payment because he has some contract with any bank which can offer users to have a discount when buying. After you answered him, he will make an order on other sellers' shops with the same price as you made to him. Then he chose the same bank as you answered him and send you one link. With filling in the information on this phishing website, you buy the goods for the swindler.

So as the users, we should know that the event organized by Taobao can be found on the official website. Taking care about the winning prize messages sent by SMS, mail, and trade manager on Taobao. Especially not fill in personal information easily. The customer service of Taobao will not ask you the bank card number, ID, or the identified number. And one more, you should know the real website address of Taobao, Tmall, and Alipay. In

the process of payment on Taobao, sellers do not need to know which net bank you are using now and there is no preferential event made between sellers and banks.  
(Qingxu 27 August 2014.)

Second, using Trojan to steal the buyers' information from the sellers. Swindlers do not just cheat the buyers, the sellers are also their targets. One is stealing customers' information for their next to cheat the customers. How do they steal the information? The normal one is still by sending Trojan.

One seller has faced this problem, he got a high rate of returning notes and lost many customers because the swindler act as him using the methods we talked before to cheat the seller's customers. Then he got a high rate of returning notes and lost many customers for the cheated customers returned some bad comments. How did he lose the information? After he sent this matter to the customer service of Taobao, they found the reason. It is that the sub-account downloaded the Trojan. The swindler acted as a customer to make an order to the sub account, and he said the order is large so he sent one document to make the order. After opening the document, the sub account downloaded Trojan. In this way, the swindlers got the information of buyers from the seller.

To avoid this security problem, the seller should do like this:

- Set automatically reply after the buyer makes the order. With some prompting messages to prevent the buyers from being cheated.
- Download digital certificate for the sub accounts and change the password of the sub accounts and the main account.

(Qingxu 17 March 2014.)

There are so many cheating methods, but the mainly ones are these two. If you are already being cheated, complain on Taobao and post on BBS of Taobao to tell others is the things you should do online. And offline you should call the police to get some help.

## **6.5 Browser**

Another one important application on the phone is the browser. So what kind of browser are Chinese using on the phone?

The mainly phone browser Chinese using in 2016 are UC browser, QQ browser, Baidu Mobile and 360 browser.

### 6.5.1 Four browsers

#### 1. UC Browser.

The UC browser was released in 2004 by UC Company which was bought by Alibaba Group in 2014 (Sina Technology 2014a). UC can run on more than 200 brands of phone maker, nearly 3000 phones, like Symbian, iPhone, Windows Mobile, Windows CE, BlackBerry, Ophone, Java, Brew, MTK and so on (Wang, Y. 2014). The quarter active users of UC have reached 600 million in 2016 (NetEase 2016).

UC offers speech recognition to help open the website, query information, do literal input... It also offers a reading model, makes you have a good feeling while reading and it can browse the next page previously to make users read without waiting. It also has the function of security, can protect the safety of your searching and downloading, and it also has the warning of the phishing Wi-Fi to keep you away from being stolen information.

With the backup of the UC data group and Alibaba group, UC change itself from the simple searching browser to the pushing notification platform with information you like.

#### 2. QQ browser

The QQ browser is developed by Tencent for the mobile users. It is a software that is suitable for the WAP and WWW websites searching.

QQ browser offers more fast searching speed and respond no delay. It offers safety searching, the unsafe websites are shielded by it. The functions of QQ browser are stronger, it has high speed downloading, full screen showing, self-defining shortcut-keys and so on.

Different to other phone browsers, QQ browser persists in developing browsers. In the data, it has the backup of the Tencent QQ, WeChat. The information pushed by QQ Browser is deep and wide. And its target is the people of 80s and 90s. As they are the mainly users of QQ, so Tencent knows them well, the pushing notification is more interesting to them. So it is more popular with these people. (iiMedia 2016, 25.)

#### 3. Baidu Mobile

Baidu's browser is named as Baidu mobile. It is developed for the mobile users to search at all times and places.

Baidu mobile offers intelligent searching, with the backup of Baidu, it makes the searching result more accurate. There are picture searching and voice searching. You can free your hand to make the voice searching. Otherwise, searching with picture is more convenient when you even don't know the name of the things. You can follow the information you are interested in, and see it at any time. It also has the function to follow the novel, you can see it behind this item to see whether the novel is updating or not. And now it also the function as a purse, help users to transfer, pay the fees and many other functions like other third party payment.

#### 4. 360 browser

360 browser is developed by Qihoo.

360 has own characteristics, like starting with 0 second to make the users have a better experience of surfing the internet. It also offers the network hot words, you can know the immediate fashion by this. 360 has increased the reading model, the joint of the previous page and the next page makes your reading more easily.

With the backup the 360 safety developed by Qihoo too, the 360 is safer than others to prevent the phishing website (iiMedia 2016, 22). So with this, 360 browser interest a lot of users.

#### **6.5.2 Security**

While talking about the browser security, the method used to transmit information is the main things we need to concern about. But it is not the users can change even if the transmitting is not safe. Some unsafe transmits the browser can find and tell you, it's an unsafe website whether you'd like to open or not. At this time, please choose the choice 'close' not to insist on surfing it. And not download some unknown documents from any unknown website. But what if even the browser itself hasn't found it? One way is that we can download the application which is relative security.

#### **6.6 Security Software**

We talked so many applications and their security before, in fact there is one kind application is especially used for protecting other applications that is security software. How do they work to protect your smart phone's security?

First, they can kill Trojan and other malicious software. Second, they can protect the process of shopping online. Third, they can prevent you from paying malicious charges. Forth, they can protect your personal information. Besides the 4 main functions, they are many other functions in different security software. What are the popular security software used in Chinese smart phones?

The popular security software used in China is 360Mobile Security, Tencent Mobile Manager, Baidu Mobile Security, and Ali Qiadun.

360Mobile Security is released by Qihoo in 2009 (Techweb 2014), it is a free mobile security software. It can be used in the system Symbian, Android, IOS, and WP8. It has the services like preventing harassing calls, harassing SMS and losing personal information, and scanning the mobile to find the malicious software, cleaning the mobile to update the speed of the phone and so on. With the clear user interface, it is popular with Chinese Android users. (360 Mobile.)

Tencent Mobile Manager is released by Tencent, it is a free mobile security and management software. It can be used in the system Android, Windows Phone and IOS. It offers the services including scanning and killing malicious virus; preventing harassing calls and SMS; preventing losing the phone; managing the software by preventing them from reading other information they do not need, by scanning the software while downloading to make sure it is security, and by updating software ; cleaning the mobile to update the mobile's speed; protecting personal information by encrypting them; and also the protection to the application WeChat which belongs to Tencent by scanning the payment process and logging in environment. (Tencent Mobile Manager.)

Baidu Mobile Security is released by Baidu, it is also a free mobile security software. It can be used in the system Android and IOS. It offers the following services. Update system by deleting the rubbish of the system to update the mobile's speed and protecting the battery to have longer useful time. Manage background program. Also prevent harassing calls and SMS. Scan the software with advertisement plugin. Protect the paying process and release the compensation plan which means if users start this service, while the account password are stolen and because of it you lost money, you can get compensation from Baidu. (Baidu Mobile Security.)

Ali Qiadun is released by Alibaba Group in October 22<sup>nd</sup> 2014 (Sina Technology 2014b.), it mainly focuses on protecting shopping online and fund transactions. It can be used in the system Android and IOS. It offers many services. Protect every step of the online



shopping. Help users reduce the risk of being cheated with the backup of big data. It also releases the compensation service. Protect personal information and fund security by encrypting the data while you start Alipay, Taobao, and net bank on the phone with Wi-Fi, it can usefully protect you from the hacker. (Ali Qiandun.)

Chinabyte.com has made a test of these four security software in four parts and make a comparison (ChinaByte 2016). Let us have a look.

Part one, preventing viruses. It took a test about the time used for finding and killing the virus, whether it has tested out malicious two-dimension code and virus, Wi-Fi, and system vulnerabilities.

Table 4. Test 1 for preventing virus.

Security Test	Time for killing virus	Malicious two-dimension code	Malicious virus	Wi-Fi Test	System testing
360Mobile Security	48s	√	√	√	√
Tencent Mobile Manager	10.02s	√	√	√	√
Ali Qiandun	16.63s	√	√	√	√
Baidu Mobile Security	10.25s	√	√	√	√

From the using time, Baidu Mobile Security and Tencent Mobile Manager used less time than the other two. The embedded virus and the system vulnerabilities can be found by all four software. In the Wi-Fi test, only Baidu Mobile Security needs to start the service manually, not simple as other three ones.

Part two, protection to fund. It has tested the payment security and compared the compensation.

Table 5. Test 2 for fund protection.

Fund Security Test	Payment Security	Compensation or Not	Compensation Range	Compensation
360Mobile Security	√	√	No detailed explanation	70,000
Tencent Mobile Manager	√	√	WeChat Payment, QQ Payment and Tencentpay	100,000
Ali Qandun	√	√	All Taobao, Alipay and bank account	1,200,000
Baidu Mobile Security	√	√	No detailed explanation	100000

360Mobile Security has the payment guard to protect the payment and what's more it can add application to be protected manually. The payment guard in Tencent Mobile Manager needs to be added by users and it can only protect parts of the applications. In Ali Qandun, it has the setting on the home page to protect net bank account, Taobao account, and AliPay account. It is not only one account but can protect many accounts. The setting in Baidu Mobile Security, the operation is harder than others.

About the compensation, Ali Qandun compensates the loss in the bank account, Taobao account and AliPay account with the highest compensation 1.2 million RMB. Tencent Mobile Manager only compensates to the applications of Tencent, not including bank account with the highest compensation of 100 thousand RMB. The other two do not have minute explanation.

Part three, preventing harassment. It tested in preventing the harassing calls and cheating SMS; recognize strange number calling, networking calling, unshown number and even dead number calling, junk messages, and phishing websites.

Table 6. Test 3 for harassment preventing.

Harassment Prevent Test	Harassing calls and cheating SMS	Strange number calling	Net-working calling	Un-shown number and dead number calling	Junk messages	Phishing websites
Ali Qi-andun	√	√	√	√	√	√
360Mobile Security	√	√	×	√	√	√
Tencent Mobile Manager	√	√	×	√	√	√
Baidu Mobile Security	√	×	×	√	√	√

In the test, Ali Qiandun has the best performance. It prevents these things comprehensively especially it has good performance in preventing strange numbers call, networking call, unshown number and dead number calling. 360Mobile Security and Tencent Mobile Manager rank the second follows Ali Qiandun. While Baidu Mobile Security rank forth, for it cannot stop the strange number calling and networking calling.

Part four, prevention of phone burglary and protection of personal information. It tested in basic prevention and prevention of the security software from itself uninstalling, the prevention on its web page, and personal information protection. The basic prevention includes mobile location, mobile locking, photo taking, far ranging alarming, and clearing data. Personal information protection is mainly the locking of applications especially the fund applications.

Table 7. Test 4 for personal information protection and phone burglary prevention

Personal information protection and burglary prevention Test	Basic prevention	Software itself uninstalling	Web page Protection	Personal information
Ali Qiandun	√	√	√	√
360Mobile Security	√	√	√	√
Tencent Mobile Manager	Without some functions	√	√	√
Baidu Mobile Security	×	×	×	√

From this part of the test, Ali Qiandun and 360Mobile Security do well, pass all items in this part. While Tencent Mobile Manager just doesn't have the function of taking photo remotely and clearing data. Baidu Mobile Security doesn't have the function of prevention of phone burglary. In the item of protecting personal information, every software has the application lock.

With the help of the security software, your phone can be safer. So think about yourself, are you always doing online shopping with the phone, or do you always download different kinds of applications to your phone, or do you always easily get harassing calls? If so, choose one security software to make your phone safer.

## 7 Conclusion & Discussion

In 2016, the shipments of smart phones is 467.3 million in Chinese market, which has increased 8.7% to the shipments of 429.9 million in 2015. OPPO is the No. 1 in the market with the shipments of 78.4 million. Huawei with the number of 76.6 million ranks second. Vivo with the number of 69.2 million is the third one. Apple with 44.9 million and Mi with 41.5 million follow them. Now, Chinese users are not only satisfied with the phone has the high performance price ratio, but pursuing the phone of brand which is a fashion instrument and can show their personal taste. So OPPO has increased 122% to 2015 and Vivo also increased 96.9%. (Askci 2017.)

Wishing the phone to be a fashion instrument with online shopping, online payment, watching video, social life and many other services, we just need to download some applications to the phone. In 2016, the top 15 applications in the Chinese market are WeChat, QQ, Wi-Fi Master key, QQ browser, Taobao, Tencent Mobile Manager, iQiyi, QQ Live, KuGou, Toutiao, Baidu mobile, Moxiu, Alipay, UC browser, Tencent News (36Kr 2017).

So many applications are used by Chinese users in China so many times every day. They provide so many conveniences to users but they also bring some problems to users. The problem is the security problem. Losing personal information, getting harassing call, receiving spam messages, being cheated because of the fund application are the common problems happened to these applications' users.

How do you lose personal information? The phishing websites get user's personal information easily by your filling in it. The message with link gets user's personal information by attaching virus to the link. The password of the account is too simple to guess by the hacker. The free Wi-Fi you used outside is from attackers. The two-dimension code has Trojan with it. The faking customer service gets your account and password by you replying to the message they send you. How do you get harassing calls or spam messages? The numbers you offered to attend some events may be sold by the holders. How do you be cheated? You believe in you have got a prize the swindler said. You believe that the messages you received are from your relatives to borrow money. You believe you can get a lower price for the high quality goods. You follow the operation the swindler told you so you give money to them instead of receiving money. You think the one who sends you a message about your account safety are real customer service without any doubt.

To avoid these problems and have a safety using environment for your phone, you should take some measures.

1. Do not searching unknown websites or using unknown applications.
2. Do not leak out your personal and account information in any situations to others.
3. Do not downloading some unknown documents to avoid Trojan.
4. Update your application and system duly.
5. Download safety application to protect your account.
6. Set your password with as long as it allowed, use combined password, do not use your account user name in your password, put one symbol in the easily guess word in your password, do not use your personal information as your password like birthday or phone number.
7. Changing your passwords at set intervals.
8. Do not use the same password to different accounts, like the email account, the paying account, the application's account and so on.
9. Be careful while buying goods, there are many traps in it, like the free trial to cheat your posting fee, the goods cannot be the high quality one with that low price.
10. Do not believe the messages said that you have got one prize, they are mostly sent by swindler to ask you pay money first.
11. Ask more questions while your 'friends' borrow money on the web.
12. Caring about the website you browser, whether it is the real one or the clone ones, the phishing ones.
13. Your personal information must be kept secret, do not believe in any unknown calling.

All these measures you have taken, your phone should be more security than now it is. Even though it cannot prevent all security problems, mostly can be. Anyway, remember one thing, which is 'there is no free lunch'. Remember them you will at least get away from getting cheated.

In fact, I think it doesn't only fit the situation of Chinese applications. It also fits for the similar applications in other countries. Thinking about the social applications you are using now, have you ever faced any problems that I have mentioned in the thesis? If the answer is yes, you may regret meeting the thesis so late, while if the answer is no, just do the measures as I said to prevent the loss and damage of the data or the system and also yourself.

About this thesis, I think it is useful. I have showed many risks on the applications that Chinese are using now. It can help users to prevent many risks like losing information or money. It does have help for Chinese especially, but of course, for other people, it also

can warn them to care about the applications they are using. So at all I think this thesis is a successful thesis for recently using.

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**I must make an apology for most of my references are in Chinese. And I used English translations of the Chinese texts in documenting my sources.**

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